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Cars and Environment – regulating for CO₂ reduction

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Cars - History of Regulatory Concerns

Crankcase emissions (1950s)
tailpipe emissions (60s-00s)
VOC emissions (80s-00s)
CO2 emissions (90s-00s)
sustainable development (90s-00s)
sustainability/LCA (90s-00s)
EU regulation

- 1996/7: **Euro 2** - further **tightening**
- 2000/1: **Euro 3** (+auto-oil) - EU in line with US Federal standards
- 2005: **Euro 4** (+auto-oil) - EU moves beyond US
- 2009/11: **Euro 5**
- 2014/15: **Euro 6**
Attempt at global harmonisation: Bellagio Principles

Meeting of top regulators from significant automotive countries who agreed a set of common principles for future regulation
Getting EU industry support for regulation: Cars21

“A Competitive Automotive Regulatory System for the 21st century”

- Developed by the European commission (DG Enterprise) with automotive stakeholders (e.g. ACEA)

- Introduces the ‘Integrated approach’ – moving on vehicle and fuel standards (industry) together with regulation and consumer incentives (government)
Carbon dioxide has been identified as a contributor to the greenhouse effect.

Human activity is speeding up the release of fossil carbon and hence upsetting the natural carbon cycle (IPCC - Intergovernmental Panel on Climate Change, 1996).
Transport CO2 (% of total):

- Cars represent about 14% of total EU CO2 emissions
- Oil imports for car = €140bn/yr
- Value added of EU car, truck and LCV industry = €132 bn in 2005
How do you reduce CO2?

• Improve fuel consumption - increase powertrain efficiency; reduce weight

• use non-carbon or lower-carbon alternative fuels (e.g. H2; CNG, LPG)

• use carbon-neutral fuels (e.g. ethanol, biodiesel)

• reduce total miles driven (e.g. London Congestion Charge)

Regulation, self-regulation or relying on 'the market'?
Regulation works: CO2 and company cars; the UK Experience

Case study
UK

• $\text{CO}_2$-based road tax regime

• $\text{CO}_2$-based company car taxation system

• Incentives for alternative fuel vehicles

  • Fuel price escalator (dropped 2000)
CO2 and Company Cars

- All cars are classed in bands of CO2 emissions
- Personal tax liability for the car as ‘benefit in kind’ is also levied in bands related to these CO2 categories
- Between 50% and 70% of new car sales in UK can be classed as ‘company’ cars > controlling these will rapidly affect the parc as a whole
Consumer info (UK)

- In response to EU directive
- Based on existing system for white goods
- Based primarily on CO2 emissions
- CO2 emissions for each car available in UK is also listed in car magazines
UK new car CO2 emissions 1997-2007
(source: SMMT)
UK CO2 performance by band

![Graph showing CO2 performance by band from 1997 to 2004.](image)

**Legend:**
- **F** (186+g/km)
- **E** (166-185g/km)
- **D** (151-165g/km)
- **C** (121-150g/km)
- **B** (101-129g/km)
- **A** (<100g/km)
130 g/km?

February 2007: EU Commission, DG Environment proposes introduction of regulation to reduce new car emissions to average of 130g/km by 2012.
EU CO2 Regulation History

- **1994:** proposal by then German environment minister Angela Merkel for 120g/km; Target date set for 2005
- **1996:** target date moved to 2010
- **1998:** voluntary agreement: 140 g/km by 2008, 120 g/km moved to 2012
- **2007:** 2012 target changed to 130 g/km
- **2007:** weight-based targets per manufacturer
- **2007:** penalty system proposed
- **1/9/2008:** EU parliament industry committee votes to postpone deadline to 2015
- **3/9/2008:** EU parliament environment committee votes for increasing penalties and speeding up phase-in
130 g/km is not rocket science; <you can buy several 130 g/km cars today

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Models</th>
<th>CO2 (g/km)</th>
</tr>
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<tbody>
<tr>
<td>BMW</td>
<td>116, MINI Cooper D</td>
<td>118-122</td>
</tr>
<tr>
<td>Citroen &amp; Peugeot (PSA)</td>
<td>C1, C2, C3, C4, 1007, 107, 207, 206, 307</td>
<td>109-129</td>
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<tr>
<td>Fiat</td>
<td>Panda, Grande Punto</td>
<td>114-122</td>
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<tr>
<td>Ford</td>
<td>Fiesta, Focus, Focus C-Max</td>
<td>114-129</td>
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<tr>
<td>Honda</td>
<td>Jazz, Civic Hybrid</td>
<td>109-129</td>
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<tr>
<td>Hyundai-Kia</td>
<td>Amica, Picanto, Rio, Cerato</td>
<td>121-129</td>
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<td>Mazda</td>
<td>2, 3</td>
<td>124-128</td>
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<td>Mercedes-Benz, Smart</td>
<td>A-class, For2, For4, Roadster</td>
<td>90-128</td>
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<tr>
<td>Mitsubishi</td>
<td>Colt</td>
<td>126</td>
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<td>Renault &amp; Nissan</td>
<td>Clio, Modus, Megane, Micra</td>
<td>115-126</td>
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<tr>
<td>Opel-Vauxhall</td>
<td>Corsa</td>
<td>124</td>
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<td>Toyota-Daihatsu</td>
<td>Aygo, Yaris, Prius, Charade, Sirion</td>
<td>104-127</td>
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<tr>
<td>VAG</td>
<td>Polo, Fabia</td>
<td>124-127</td>
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<tr>
<td>Volvo</td>
<td>C30 1.6d, S40 1.6d</td>
<td>129</td>
</tr>
</tbody>
</table>
Effect of the *threat* of legislation: Progress by car maker 2006-2007
(source: T&E)
Distance to proposed target
(source: T&E)

Suzuki
Daimler
Mazda
Nissan
BMW
VAG
Ford
GM
Hyundai
Honda
Toyota
Fiat
Renault
PSA

2012 target
CO2 2007
This legislation has the potential to transform the car industry

The problem of averages:

- For every car/SUV that exceeds the average by some margin several very low CO2 vehicles have to be sold
- A split will occur between smaller cars which can comply with little or no change and larger cars which need expensive new technologies to come anywhere near the average
Possible market impact of 130 g/km from 2012

- Vehicles currently in Bands D and E can mostly be adapted to meet requirements for band C, hence these segments will be squeezed.
- Band F will disappear, but G will survive to accommodate the few remaining ‘gas guzzlers’, together with the smaller bands D and E.
- New product will be developed for bands A and B. Band A will see new plug-in-hybrids and very light-weight IC vehicles.
THE END